

former is widely distributed throughout Australian, Neartic, Oriental and Palaeartic regions and the latter has been recorded from Oriental, Palaeartic and Australian regions. *D. (Zeugodacus) cucurbitae* Coquillett (originally described from Hawaii Islands) is now widely distributed all over the world.

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36. LIFE-HISTORY PATTERN OF THE FRESHWATER LEECH *GLOSSIPHONIA WEBERI* (BLANCHARD) [HIRUDINEA: GLOSSIPHONIDAE]

(With a text-figure)

Glossiphoniid leeches suck the body fluids and sometimes devour the flesh of some freshwater snails (Mann 1962, Raut and Nandi 1980) some of which are disease-transmitting species. Considering the potentiality of glossiphoniid leeches in the biological control of the disease-transmitting snails, different workers have studied the ecology and life history of several leech species in the Western countries (Mann 1962, Bay *et al.* 1976). In India, very little attention has been paid to the bioecology of leeches. In recent years, Raut and Nandi (1980, 1984 and 1985) and Raut and Saha (*in press*) have furnished information on the food, feeding and growth rate of the leech *Glossiphonia weberi*. Ray (1980) and Raut (*in press*) have studied the parental care in *Helobdella nociva* and *Hemiclepsis marginata* respectively. Soota *et al.* (1982) supplied the data on the ecology of the leeches of the arid

region around Jodhpur. Since *G. weberi* is an effective predator of the disease transmitting snail *Lymnaea luteola* (Raut and Nandi 1980, 1984 and 1985) information on the life history of this leech species, described in this paper, would prove helpful in designing a successful control programme for the vector snails.

MATERIALS AND METHODS

On December 6, 1984, 15 gravid leeches (*G. weberi*) bearing eggs at different development stages were collected from the pond attached to Indian museum, Calcutta. They were reared in an aquarium under laboratory conditions. The leeches were supplied with juvenile individuals of a freshwater snail *Lymnaea luteola* as their food. Within a week the eggs hatched. Of a total of 30 new born leeches, those which hatched on December 10, 1984 and left their mother on December 12, 1984 were

considered for the study of their life history. The young leeches were kept separately in a museum jar measuring 10 x 5 x 5 cm. The jar was filled with pond water up to 7 cm height. As per preference stated by Raut and Nandi (1984, 1985) the leeches were supplied with young *L. luteola* between 3 mm to 6 mm shell size regularly as their food. Throughout the experiment, museum pond water was used. The water in the jar along with the dead and decomposed snails, if any, was replaced regularly to maintain hygienic conditions.

RESULTS

On March 28, 1985 i.e. at the age of 107 days, when the leeches attained 19 mm of their body length, a greenish elongated patch at the mid-ventral region (Fig. 1A) of 21 individuals was visible. In a leech with 11 mm body length at resting state the patch measured 3.5 mm in length located 4.0 mm away from the posterior sucker and 3.5 mm behind the anterior sucker (Fig. 1A). In the remaining 9 individuals the greenish patch formation was completed within the next 28 days. Of the 9 leeches, the greenish patch in two individuals was observed on April 25, 1985 i.e. at the age of 135 days. In all cases, the patches thickened and after 3 days (after the appearance of the greenish patch) the greenish patch transformed into a rounded mass protected by a transparent sac — the cocoon. The cocoon was 1.0 mm in diameter, situated close to the posterior sucker (Fig. 1B). Within the next 20-40 hours from its initiation the cocoon became flattened and the eggs were distinctly visible at this stage (Fig. 1C). They gradually increased in size and on the 3rd day (from the day of cocoon formation) they attained the maximum size. By this time the colour

changed to white. Due to the transparent sheath of the cocoon the eggs were visible from outside. The distinctly isolated eggs were

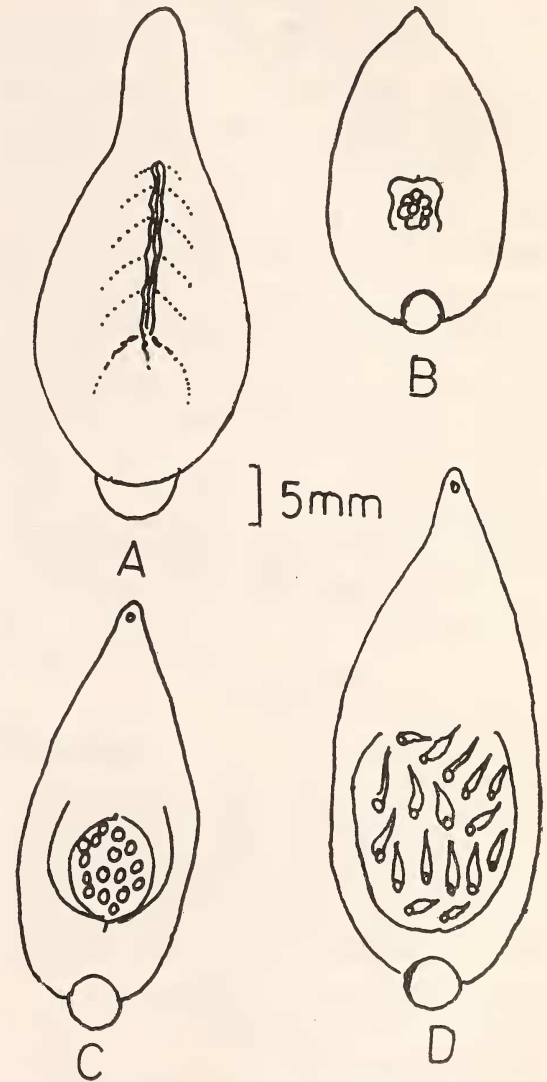


Fig. 1. Formation of eggs and young in *Glossiphonia weberi*.

A. Appearance of greenish patch, B. Cocoon formation (early stage), C. Cocoon (final stage), D. Young ones attached to the mother following hatching.

distributed in a haphazard fashion. inside the cocoon (Fig. 1C). They were counted at this stage. The number of eggs per cocoon varied from 16-38. The eggs were 0.87 mm to 1.24 mm in diameter. The eggs hatched on the 8th and/or 9th day (from the day of cocoon formation). Immediately after hatching the young leech remains attached with the mother at the point of attachment of the egg (Fig. 1D) by a peculiar ball and socket system as has been reported by Mann (1955). At this stage the mother leech did not take any food. They were seen to rest on the wall of the jar and to undulate the body at a regular rhythm.

Finally, on 11th and/or 12th day the young leeches left the mother and started independent life. At this stage they were 3-3.5 mm in length.

The 30 leeches used for this study survived for a period of 6-9 months and produced 2-4 broods. Temperature and pH of water in the jar ranged from 16-36°C and 8.01-8.35 respectively.

DISCUSSION

Data collected on the 30 experimental leeches indicate that *G. weberi* required 107-136 days to complete the life cycle. The leeches attained sexual maturity at the age of 96-124 days and from the formation of eggs up to the release of young 11-12 days are needed. According to Mann (1955) *Glossi-*

phonia complanata breeds at the age of one year, and the time which may elapse between copulation and cocoon deposition is 8-21 days. *G. complanata* holds the eggs in the cocoon for 5-6 days, holds them by the embryonic attachment organ for 4-5 days and then harbours the young leeches which hold on to their mother by their posterior sucker for up to 14 days so that the whole process occupies about 24 days (Mann 1957). *Theromyzon tessulatum*, on the other hand, may hold the eggs in the capsules for 8-10 days, and then holds them under her body for nearly four months (Mann 1951). In the present study it is clear that *G. weberi* holds the eggs in the cocoon for 7-8 days, holds them by the embryonic attachment organ for 1-2 days and then shelters the young leeches for 2-4 days.

It appears that *G. weberi* and *G. complanata* despite their being the members of the same genus show striking differences in all aspects regarding their breeding. This may be considered as the species specific factor, which most probably, is influenced by the physico-chemical parameters of the habitats concerned. In *G. complanata* maturation was accelerated with the rise of temperature as has been noted by Young and Ironmonger (1982).

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MISCELLANEOUS NOTES

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37. *IXORA PUBIRAMA* BREM. (RUBIACEAE) — A
NEW RECORD FOR INDIAN FLORA

(With ten text-figures)

Hooker f. (1880) enumerated 17 species of *Ixora* from British India that included Burma. Bremekamp (1937, 1959), while revising the genus *Ixora* of Burma and Andaman & Nicobar Islands added five species and one variety to this tally, bringing the total to 22 species.

While studying the material of *Ixora* at various Indian herbaria, we came across a number of specimens of *I. pubirama* Brem., a species of Lower Burma, collected from Andaman Islands. These specimens lay misidentified since their collection in 1977.

Ixora pubirama Brem. thus constitutes a new

record for the Indian flora and is being described and illustrated in this paper.

Ixora pubirama Brem., *Journ. Bot.* 75: 173.

1937. *I. cuneifolia* Roxb. var. *puberula* Kurz., *Contr. Bur. Fl.* 150 et *For. Fl. Bur.* 2: 21. 1877. *I. puberula* Wall., *Cat. n.* 6145 (quoted a et b in *Herb. Wall.*) nomen tantum; non *I. puberula* (Hiern) Kuntze in *Rev. Gen. Pl.* 1: 287. 1892 quoe est *Pavetta puberula* Hiern.

Type: *C. E. Parkinson*, 213 Maymo Herb. (not seen).

Shrub 1-3 m tall, branches pubescent; stem solid, rounded pubescent; internodes 1-8 cm